Remarks

The Official Action objected claim 11 and rejected claims 1-25. Applicant has

amended claims 1-3, 5, 7, 11-24, added new claims 26 and 27 and canceled claim

25. Claims 1-24, 26 and 27 are now pending in the present application. Applicant

respectfully requests reconsideration and allowance of the pending claims in the light

of the points that follow.

Claim Objection

The Official Action objected claim 11 as being vague and unclear. Applicant

has deleted the description "one channel, one channel or is receiving..." from claim

11. Applicant respectfully point out that the objection on claim 11 is overcome

according to the above-mentioned amendments.

Claim Rejections – Under 35 USC § 102

The Official Action rejected claims 7-10, 12 and 21 under 35 U.S.C. 102(e) as

being anticipated by Joseph et al. (U.S. 6,628,615). Applicant has amended claims

7, 12 and 21. Applicant respectfully requests the present rejection be withdrawn.

Claim 7

The amended claim 7 requires determining **availability of valid data** in each

of at least two channels, wherein said at least two channels share a physical

connection to transfer data between a first node and a second node; determining

backpressure from a receiver of each channel; and interleaving flits from said at least two channels along the physical connection based on said availability of valid data and said backpressure.

Applicant respectfully points out that Joseph et al. seem to provide a two level virtual channel network interface (see col. 4, lines 20-36). In particular, Joseph et al. disclose that each network interface comprises a plurality of second level channels, wherein each second level channel transfers information on class and priority of a message or a packet (see col. 5, lines 9-14, and col. 6, lines 37-41). Further, Joseph et al. appear to teach selecting a first level channel interface to which a flit will go out on based on channel class (see col. 6, lines 59-67); formatting the flit based on packet data from a second level channel (see col. 6, lines 1-13); determining a first level channel based on message priority (see col. 7, lines 13-15); determining when to pull packet data from a second level channel for flit formatting based on message priority (see col. 7, lines 13-21); and multiplexing flits from the first level channel onto network 406 (see col. 7, lines 32-33). Accordingly, Joseph et al. seem to disclose transferring data via a two level virtual channel network interface based on class and priority information, which is different from interleaving flits based on availability of valid data and back pressure on channels. Therefore, Joseph et al. do not teach or suggest availability of valid data in each of at least two channels and/or backpressure from a receiver of each channel, not anticipating the inventions of Applicant's claim 7.

Applicant respectfully requests that the present rejection of claims 7 and 21 be withdrawn.

Claim 21

The amended claim 21 requires determining whether a first controller and a second controller **have data to send**, wherein the first and second controllers are connected to a channel; and in response to determining that only the first controller has data to send, sending data via the first controller.

As mentioned above, Applicant respectfully points out that Joseph et al. seem to disclose transferring data via a two level virtual channel network interface based on class and priority information, rather than sending data via a controller that is determined to have data to send. Therefore, Joseph et al. do not teach or suggest determining whether a first controller and a second controller have data to send, wherein the first and second controllers are connected to a channel; and in response to determining that only the first controller has data to send, sending data via the first controller, not anticipating the inventions of Applicant's claim 21.

Claims 8-10 and 12

Claims 8-10 and 12 depend on claims 7. Therefore, claims 8-10 and 12 are at least allowable for the reasons noted above in regard to claim 7. In addition, Applicant would like to point out features of dependent claims 8-10 and 12 that are neither shown nor suggested by the cited reference.

In particular, claim 9 calls for storing said reformed packets in queues for transfer to a processor bus. Joseph et al. appear to merely disclose recomposing flits into packets for storage, Joseph et al. do not suggest or teach storing reformed flits in queues for transfer to a processor bus as recited in Applicant's claim 9.

Claim 10 calls for said processor bus transfers data in a different type of resource sharing paradigm than said physical connection. Joseph et al. appear not to disclose a processor bus but seem to teach implementing a packing algorithm for assembling flits for transmission over the network (see col. 7, lines 64-67). Accordingly, Joseph et al. do not inherently anticipate the invention of Applicant's claim 10.

The amended claim 12 calls for transferring said flits from each channel across the physical connection, in response to determining that the other channel is receiving backpressure from the receiver. Joseph et al. appears to disclose determining class and priority of a message, which does not inherently suggest the determining backpressure from the receiver, not anticipating the invention of Applicant's claim 12.

Applicant respectfully requests that the rejections of claims 8-10 and 12 be withdrawn.

Claim Rejections – Under 35 USC § 103

The Office Action rejected claims 1-6, 11, 13-20 and 22-25 under 35 U.S.C. § 103(a) as being unpatentable over Joseph et al. in view of Walsh et al.

(U.S.5,329,521). Applicant has amended claims 1-3, 11, 13-20, 22-24, and canceled

claim 25.

Applicant respectfully points out that, to establish *prima facie* obviousness of a

claimed invention, all the claim limitations must be taught or suggested by the prior

art. *In re Royka,* 490, F.2d 981, 180 USPQ 580 (CCPA 1974, M.P.E.P. §2143.03).

Claims 1, 13 and 17

The amended claim 1 requires said first controller and said second controller

being in communication and controlling interleaving of data from said two channels

through said physical connection based on **availability of valid data** in the said two

channels to be transferred. The amended claim 13 requires flits from both channels

being interleaved in said physical connection based on whether **flits are available**

for a transfer. The amended claim 17 requires said first controller and said second

controller being in communication and controlling interleaving of data from said two

channels through said physical connection based on whether the first and the

second channels **have valid data** to be transferred.

As mentioned above, Applicant respectfully points out that Joseph et al. seem

to disclose transferring data via a two level virtual channel network interface based

on class and priority information, which is different from controlling interleaving of

data based on availability of valid data or flits. Therefore, Joseph et al. seem to be

devoid of any teaching or suggestion on controllers controlling interleaving of data

based on the availability of valid data or flits, as recited in Applicant's claims 1, 13

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and 17, since Joseph et al. appear to disclose each second level channel corresponds to one path between two nodes (see col. 5, lines 19-21)..

Further, Applicant respectfully points out that Walsh et al. seem to disclose a system transmitting messages from one node over both links 10 and 12 and selective receiving messages from link 10 or 12 with the least error (see col. 3, lines 15-28; and FIGs. 2-4) Accordingly, it appears that Walsh et al. does not need or suggest controllers for controlling interleaving of data based on availability of valid data or flits, since the system of Walsh et al. transmits messages on both links and receive messages based on an error situation.

Since Joseph et al. and Walsh et al., taken separately, are devoid of any teaching or suggestion of the limitations recited in Applicant's claims 1, 13 and 17, the combination of Joseph et al. and Walsh et al. must necessarily be devoid of the required teaching or suggestion of all the elements recited in Applicant's claims 1, 13 and 17. Consequently, the combination cannot make Applicant's claims 1, 13 and 17 obvious.

Thus, the *prima facie* obviousness of the inventions of Applicant's claims 1 and 17 can not be established. Applicant respectfully requests that the present rejections of claims 1 and 17 be withdrawn.

Claim 25

The Applicant has canceled claim 25. Applicant respectfully requests that the present rejections of claim 25 be withdrawn.

Claims 2-6, 14-16 and 18-20

Claims 2-6, 14-16 and 18-20 depend respectively on claims 1, 13 and 17.

Therefore, claims 2-6, 14-16 and 18-20 are at least allowable for the reasons noted

above in regard to claims 1, 13 and 17. In addition, Applicant would like to point out

features of dependent claims 2-6, 14-16 and 18-20 that are neither shown nor

suggested by the cited references.

In particular, claim 2 calls for obtaining information on whether the second

ends of said two channels can accept more data and claim 3 calls for controlling the

interleaving of data further based on said information. Applicant respectfully indicates

that neither of Joseph et al. and Walsh et al. appear to suggest or teach obtaining

information on whether the second ends of said two channels can accept more data

and controlling interleaving of data based on the information, as recited in Applicant's

claims 2 and 3. Consequently, the combination cannot make Applicant's claims 2

and 3 obvious. Similarly, the combination cannot make Applicant's claims 15, 16, 19

and 20 obvious.

Claim 14 calls for one of said first and second data channels transfers flits on

the physical connection, in response to determining that a flit being sent by the other

data channel is the end of a packet. Applicant respectfully indicates that neither of

Joseph et al. and Walsh et al. appear to suggest or teach determining that a flit being

sent by the other data channel is the end of a packet or transferring flits based on the

determination, as recited in Applicant's claim 14. Consequently, the combination

cannot make Applicant's claim 14 obvious. Similarly, the combination cannot make Applicant's claim 18 obvious.

Applicant respectfully requests that the rejections of claims 8-10 and 12 be withdrawn.

Claims 11 and 22-24

The amended claim 11 depends on claim 7. Applicant respectfully submits that Joseph et al. are devoid of teaching or suggesting limitations regarding availability of valid data and backpressure of claim 7, in light of the reasons mentioned with regard to 7. Further, Walsh et al. are devoid of teaching or suggesting these limitations, since Walsh et al. seem to disclose transmitting data to both links 10 and 12 and selectively receiving data based on an error situation. Consequently, the combination of Joseph et al. and Walsh et al. cannot make Applicant's claim 7 obvious. Further, claim 11 also comprises a limitation on availability of valid data. Thus, the *prima facie* obviousness of the invention of Applicant's claim 11 can not be established.

The amended claims 22-24 depend respectively on claim 21. Applicant respectfully submits that Joseph et al. are devoid of teaching or suggesting limitations regarding determining whether a first and second controllers have data to send and sending data in response to the determination of claim 21, in light of the reasons mentioned with regard to 21. Further, Walsh et al. are devoid of teaching or suggesting these limitations, since Walsh et al. seem to disclose transmitting data to

both links 10 and 12 and selectively receiving data based on an error situation.

Consequently, the combination of Joseph et al. and Walsh et al. cannot make

Applicant's claim 21 obvious. Further, claims 22-24 comprise limitations on

determining which controller is the last one to send data, determining whether the

first controller is to send a new packet. Applicant respectfully points out that Joseph

et al. and/or Walsh et al. are devoid of teaching or suggestion such limitations. Thus,

the *prima facie* obviousness of the invention of Applicant's claims 22-24 can not be

established.

Applicant respectfully requests that the present rejections of claims 11 and

22-24 be withdrawn.

Conclusion

The foregoing is submitted as a full and complete response to the Official

Action. Applicant submits that the pending claims are in condition for allowance.

Reconsideration is requested, and allowance of the pending claims is earnestly

solicited.

Should it be determined that an additional fee is due under 37 CFR §§1.16 or

1.17, or any excess fee has been received, please charge that fee or credit the

amount of overcharge to deposit account ▮▮▮▮. If the Examiner believes that

there are any informalities which can be corrected by an Examiner's amendment, a

telephone call to the undersigned at ▮▮▮▮▮▮ is respectfully solicited.

Respectfully submitted,

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